

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 99 10 3381

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on the patent document. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9613653 A	09-05-1996	DE 69503798 D DE 69503798 T EP 0788806 A ES 2118638 T JP 10508077 T	03-09-1998 14-01-1999 20-08-1997 16-09-1998 04-08-1998
JP 09280002 A	28-10-1997	NONE	
US 5382135 A	17-01-1995	DE 69321261 D DE 69321261 T EP 0702748 A MO 9412765 A	29-10-1998 20-05-1999 27-03-1996 09-06-1994
GB 2050529 A	07-01-1981	DE 3017041 A JP 55151192 A	20-11-1980 25-11-1980
US 4672727 A	16-06-1987	AU 593311 B AU 6674286 A CN 1006136 B EP 0228337 A JP 62165503 A	08-02-1998 25-06-1987 20-12-1989 08-07-1987 22-07-1987
JP 08082201 A	26-03-1996	NONE	
JP 08246802 A	24-09-1996	NONE	
US 4040767 A	09-08-1977	FR 2313551 A GB 1545904 A	31-12-1976 16-05-1979
US 5609466 A	11-03-1997	CA 2205042 A EP 0791127 A EP 0875665 A MO 9615357 A	23-05-1996 27-08-1997 04-11-1998 23-05-1996
US 5639216 A	17-06-1997	DE 69505407 D DE 69505407 T EP 0777818 A JP 10507239 T MO 9606266 A	19-11-1998 27-05-1999 11-06-1997 14-07-1998 29-02-1996
US 4134709 A	16-01-1979	NONE	
DE 19807563 A	24-09-1998	JP 10238302 A CA 2230291 A	08-09-1998 25-08-1998
US 5848876 A	15-12-1998	NONE	

For more details about this annex, see Official Journal of the European Patent Office, No 1262

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## EUROPEAN PATENT APPLICATION

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Takasago-shi, Hyogo-ken (JP)

(54) Gas turbine rotor blade platform

(57) Gas turbine moving blade platform having slim cooling structure and effecting uniform cooling is provided. Cavities 2, 3, 4 are formed in platform 1 with impingement plate 11 being provided below the cavities 2, 3, 4. Cooling hole 5 communicates with cavity 2, cooling hole 6 with cavity 3 and cooling holes 7, 8 with cavity 4 and all these cooling holes pass through the platform 1 inclinedly upwardly. Cooling air 70 flows into the cav-

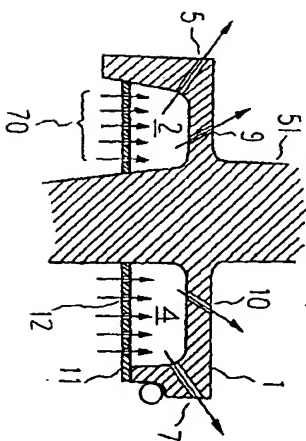
(51) Int Cl.: F01D 9/04, F01D 25/12,

F01D 5/18

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Fig. 1(b)



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## EUROPEAN SEARCH REPORT

Application Number  
EP 99 10 3381European Patent  
OfficeApplication Number  
EP 99 10 3381

EPO FORM 1503 (03.02.92) (P44C01)

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	HO 96 13653 A (WESTINGHOUSE ELECTRIC CORP) 9 May 1996 (1996-05-09) * page 4, line 26 - page 11, line 23; figures 4, 6-10 * * page 8, line 4 - page 10, line 20; figures 4-10 *	1 F0109/04 F01025/12 F0105/18
Y	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 02, 30 January 1998 (1998-01-30) - & JP 09 280802 A (MITSUBISHI HEAVY IND LTD), 28 October 1997 (1997-10-28) * abstract; figures 2, 3 *	6
X	US 5 382 135 A (GREEN DENNIS J) 17 January 1995 (1995-01-17) * column 4, line 21 - column 6, line 53; figures 2-4 *	1, 2, 4
Y	68 2 050 529 A (ENGLISH ELECTRIC CO LTD) 7 January 1981 (1981-01-07) * page 2, line 12 - line 22; figure 2 *	3 TECHNICAL FIELD SEARCHED (M.C.I.) F010
X	US 4 672 727 A (FIELD ROBERT E) 16 June 1987 (1987-06-16) * column 7, line 32 - line 50; figures 1, 9, 10 *	1
A	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 07, 31 July 1996 (1996-07-31) - & JP 08 082201 A (TOHOKU ELECTRIC POWER CO INC; MITSUBISHI HEAVY IND LTD), 26 March 1996 (1996-03-26) * abstract; figure 2 *	5

-/-

Place of search	Date of completion of the search	Lawyer
THE HAGUE	14 February 2000	Ingeblrecht, P

The present search report has been drawn up for all claims

CATEGORY OF CITED DOCUMENTS

X : particularly relevant to claims drawn up for the present application  
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## CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

## LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet 8

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claim(s):☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions first mentioned in the claims, namely claim(s):

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## EUROPEAN SEARCH REPORT

Application Number  
EP 99 10 3381

EPO FORM 1503 (03.02.92) (P04G01)

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 01, 31 January 1997 (1997-01-31) - 4 JP 08 246802 A (MITSUBISHI HEAVY IND LTD), 24 September 1996 (1996-09-24) * abstract; figure 2 *	5
A	US 4 040 767 A (DIENERGER JAMES ALBERT ET AL) 9 August 1977 (1977-08-09) * column 3, line 48 - column 6, line 31; figure 2 *	1
A	US 5 609 466 A (KENNEDY MARK T ET AL) 11 March 1997 (1997-03-11) * column 5, line 54 - line 61; figures 2, 4, 6-8 *	1, 5
A	US 5 639 216 A (MCCLURIN LEROY D ET AL) 17 June 1997 (1997-06-17) * figures 3-6 *	6
A	US 4 134 709 A (ESKESEN JOHN H) 16 January 1979 (1979-01-16) * figures 1, 2 *	5
P, X	DE 198 07 563 A (MITSUBISHI HEAVY IND LTD) 24 September 1998 (1998-09-24) * the whole document *	5
P, A	US 5 848 876 A (TOMITA YASUOKI) 15 December 1998 (1998-12-15) * the whole document *	5
The present search report has been drawn up for all claims		
Place of search		
THE HAGUE		
Date of completion of the search		
14 February 2000		
Examiner		
Ingelbrecht, P		
CATEGORY OF CITED DOCUMENTS		
X: particularly relevant if taken alone A: particularly relevant if mentioned with another document of the same category P: technological background C: intermediate document		
1: theory or principle underlying the invention E: earlier patent document, but published in, or D: document cited in the application L: document cited for other reasons B: member of the same patent family, corresponding document		

European Patent  
OfficeLACK OF UNITY OF INVENTION  
SHEET BApplication Number  
EP 99 10 3381

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

## 1. Claims: 1-4

gas turbine moving blade platform comprising a cavity formed in said platform around a base portion of the moving blade for introducing thereinto a cooling air; and a plurality of cooling holes communicating with said cavity and opening at a peripheral end surface of said platform

## 2. Claim: 5

gas turbine moving blade platform comprising two cooling passages on each side of the moving blade, communicating at the one end with a leading edge passage of the moving blade and having at its the other end an opening at a side end surface of said platform; a cover for closing said opening of each of said two cooling passages; and at least three linearly formed cooling passages in said platform, each communicating at its one end with any one of said two cooling passages and having at its the other end an opening at a rear end surface of said platform

## 3. Claim: 6

gas turbine moving blade platform consisting of an upper platform and a lower platform, a cavity between said upper platform and lower platform on each side of vertical and dorsal sides of the moving blade, and characterized in comprising a cooling passage, being bored in said upper platform along each of both side portions of said upper platform, communicating at its one end with said cavity at a front portion of said platform and having at its the other end an opening at a rear end surface of said platform; and a multiplicity of cooling holes, being bored in said lower platform and passing through upwardly into said cavity thereabove from a bottom surface of said lower platform